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BROADBAND'S IMPACT

Broadband will alter the Internet landscape, changing consumers' use and experience of on-line resources and forcing service providers to sharpen their broadband strategies.

Consumers Will Never Look Back

Once consumers get a taste of high-speed, always-on connections, they'll never go back to dial-up. Broadband access will create:

- **New on-line routines.** Broadband consumers will tap on-line event calendars and link to video previews of performers, then to venue maps and the virtual ticket window. Similarly, on-line weather, traffic, and news via the always-on PC will be part of families' morning rituals.
- **A new entertainment role for PCs.** Broadband makes the PC-Internet combo more of an entertainment medium, but its content and user behaviors will still be very different from TV. Look for interactive applications that add an entertainment element on broadband-enabled PCs. The prime candidates: games, gambling, and adult sites.
- **Web tone for new devices.** Always-on connections will spread Web content and connectivity throughout the house like a new power utility. PCs will move from the spare bedroom into the kitchen to accommodate constant usage. IP appliances including TVs, phones, and handhelds will synchronize using Net-resident directories.
- **Practical video services.** Road Runner is already testing video e-mail with a $150 camera package from Cubic Corp. that allows consumers to record video greetings, attach the file, and send it with an e-mail. It will be a short step for AT&T/TCI or others to create real-time video calls over the Internet.
- **Useful virtual reality.** Broadband will make 3-D walk-throughs of local attractions a feature of city guide sites. Road Runner in San Diego is working on capturing museum exhibits, parks, and its famous zoo using video and simulation tools from Interactive Pictures.
- **New regulatory imperatives.** Broadband will spread primarily in higher-income cities and towns where providers have an easier time selling premium-priced services. This will raise the FCC's universal access question to a new level: When mandating Internet access for all citizens, how fast is fast enough?

New Challenges For Suppliers

Technology shifts create rapid market share shifts in the Internet economy. The rise of broadband portends:

- **Another chance for entertainment giants.** Having missed the first wave of Web development, Viacom, Sony, and others must regroup to create broadband portal sites. Disney/Infoseek and NBC/Snap! are the first wave of media powerhouses combining navigation and personalization with interactive games and video advertising. Their challenge: Become trusted, content-neutral guides to "What's on the Web tonight?" rather than simply purveyors of in-house properties.

- **An expanded investment portfolio for Microsoft.** The cable industry's capital needs will only increase as operators deploy broadband and set their sights on telephony markets. We expect to see further investments in digital cable as Microsoft seeks to secure an advantage for MSN and create new system software markets.

- **New challenges for Yahoo!** To hold its lead through the transition to broadband, Yahoo! must build on its relationship with @Home and rev up its next-generation "turbo" project to incorporate video search and personalization sensors that adjust for access speed and device.

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The iMac is more of the same for Apple. We spoke with Phil Shiller, VP of worldwide marketing at Apple, who outlined the company's plans to get retail buyers to consider Apple's new $1,300 iMac. With reports of 150,000 preorders and loads of positive press buzzing in our heads, we visited the local CompUSA expecting to see them flying off the shelves. Instead, we found about a dozen unsold units. Once we put the iMac through its paces, we could see why. Sure, the translucent casing is cool, but it has a cheap, cardboardlike feel. The keyboard sports tiny function keys, and the fingertip mouse is awkward. Our take: Buyers will have to shell out extra cash for a better keyboard, mouse, and removeable storage, putting the price tag up to $1,700 -- the same as high-end Pentiums. We see consumers passing on the iMac in favor of lower-priced PCs that may be slower and less funky but will get them on the Internet just as well.

Why Wink still matters. Our suggestion that Wink should yank its IPO in the face of the new interactive television (ITV) standards drew a quick response from founder Brian Dougherty (see the July 28, 1998 *People & Technology Strategies Brief*, "ATVEF: A Standard Format For Interactive Television"). He points out that Wink's solution can support 8 million advanced analog cable boxes that will never be able to run ATVEF-based solutions. We find this argument less than compelling. Broadcasters will give up on Wink-specific coding as soon as digital set-tops begin to gain a foothold. But Wink could be relevant in the long-term based on other, less visible elements of its technology. The company has developed front-end systems that help networks deliver interactive content and back-end servers that let cable operators accumulate data from ITV viewers. As ATVEF unleashes broadcaster and cable operator interest, these assets will become valuable infrastructure elements in making ITV work.

Pay attention to Mixed Signals. There's a gritty little problem in interactive television -- delivering it means injecting data into broadcasts, but any messing about with the TV signal understandably worries the networks. Enter Mixed Signals. According to CEO Alexandria Thomson, the company builds dependable black boxes that integrate with broadcast equipment, connecting to PCs and safely laying down interactive TV codes. A $3,700 unit lets

ad agencies and Web developers build and test demos; more robust $7,000 boxes deliver interactivity live into analog and digital broadcasts. Mixed Signals has already sold more than 150 units to clients like Disney and USA Network. Our take: Mixed Signals is part of a growth industry of enabling technology, tools, and services about to rise up to meet the interactive challenges of the TV industry.

Consumer electronics giants see Microsoft's vision. Last month, Matsushita announced a strategic relationship with Microsoft, citing plans for advanced set-top boxes, WebTVs in Japan, and a Windows CE port to Matsushita chip sets. But deep into the discussion, the director of the company's Product Development Laboratory, Dr. Yoshitomi Nagaoka, revealed Matsushita's real hopes -- to build a "high-performance AV PC," which he believes will be "the most promising device for the 21st century."

We heard echoes of the same theme when Microsoft invested in Thomson Multimedia a few weeks later, persuading Thomson to build next-generation "eTVs" (see the August 3, 1998 *People & Technology Strategies Brief*, "Microsoft's Thomson Stake: A Bid For TV Relevance"). Looks to us like consumer electronics execs, stuck in a low-margin business, are ready to jump at Microsoft visions of "converged" TV/PC devices. But we don't buy it. The more complex the Matsushitas and Thomsons of the world make next-generation TV sets, the more consumers will resist.

Keep Jini in the bottle for now. Mike Clary, director of Project Jini at Sun Microsystems, came by to demo the technology. It proposes a radical shift in computing, allowing devices to "steal" processing power, disk space, and memory when needed from other devices on the network. While the concept of true network computing -- where everything is a peripheral to everything else -- is intriguing in corporate environments, Sun is touting Jini as a potential revolution in consumer electronics. No way! It will be many years before even 10% of homes are wired for serious network traffic (see the February, 1998 *People & Technology Strategies Report*, "Home Networks Debut").

Motorola's soft touch. Executives from Starfish Software and its new parent Motorola stopped by to brief us on how the software shop will operate as a unit of the telecom equipment giant. The message: business as usual. Starfish will continue to develop synchronization and software for mobile devices from Motorola and other manufacturers. It will concentrate on delivering end-to-end solutions that combine operating system, application, and synchronization expertise. Forrester believes that Motorola will continue to give Starfish wide latitude, as the cell phone industry has figured out that proprietary solutions stunt market growth for new digital devices (see the July 22, 1998 *People & Technology Strategies Brief*, "Building Smart Devices The Cell Phone Way").

Questions or comments on this month's report? Please e-mail us at cmines@forrester.com or svanboskirk@forrester.com.

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Beyond The PC

Only a handful of consumers use anything but a PC to access the Web. But silicon and software solutions for cheaper and simpler consumer gadgets are plentiful, and electronics manufacturers are interested in selling new products from interactive TVs to Web-surfing terminals. In September, Forrester will forecast the future of consumer computing and the role of the PC.

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The Forrester Forum Series

In addition to our research, Forrester offers many opportunities for you to hear directly from our analysts and other industry leaders. The Forrester Forum Series, held in various locations throughout the United States and Europe, offers unique opportunities for senior executives to informally share ideas, discover the latest technology tools and vendors, and develop successful business strategies. Our goal is for you to return to your office ready to revamp the way you sell, support, and deliver your products and services.

Upcoming Forrester Forums:

Making Internet Marketing Pay Off
The Sheraton New York Hotel and Towers, New York, New York
October 1-2, 1998

The Internet offers a new way to reach customers -- one that promises lower costs, global audiences, and targeted customization. But making the most of this medium poses challenges. As an established leader in new media technology strategy and consumer behavior research, Forrester has developed a comprehensive program that will provide real strategies for tackling the biggest issues facing on-line marketers today.

Preparing For The Real-time Internet Economy
The Westin Hotel Copley Place, Boston, Massachusetts
November 5-6, 1998

Over the next 36 months, the Internet economy will evolve from early Web marketing and selling experiments to a new business trading model that Forrester calls dynamic trade -- the ability to satisfy current demand with customized response. Dynamic trade is revolutionizing product, production, and pricing models -- and changing industry structures. Is your company ready?

For more information on the Forrester Forum Series, contact Forrester directly at 888/343-6786 (+1 617 503-0005 outside the United States), or visit our Web site at www.forrester.com.

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TO

BELLSOUTH'S NOI COMMENTS

FORRESTER
The Forrester Report

People & Technology Strategies

Volume Four, Number Nine
January 1998
Kate Delhagen
Christopher Mines
Shar VanBoskirk and Beth Vernier

Focus

Internet Access Winners

Proliferating access speeds, devices, and service options will connect millions of new consumers and jeopardize smaller Internet providers. Cable and telephone companies will be the fastest-growing consumer ISPs during the next five years, while AOL's access distinction shrinks and it shifts focus toward content programming.

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Focus

Internet Access Winners

INTRODUCTION

People choose vanilla dial-up Internet access service from two kinds of providers -- local heroes and national behemoths. How will this business play out during the next five years as millions more people connect and new technologies challenge dial-up access? Forrester concludes that:

- Today's consumer ISP market is polarized. Most ISPs with fewer than 50,000 consumers are turning profits, while national ISPs are losing money.
- Of today's 23 million households on-line, 99% are PC-based dial-up accounts. By 2002, always-on, high-speed connections like cable modems will grab a 21% slice of the 62 million on-line households.
- Wide variation in demand will trigger a new battle for customers. Three classes of access providers will emerge, with cable and telephone companies growing fastest while content-based networks like AOL migrate toward content and transaction businesses.

To research this report, Forrester surveyed 55 consumer ISPs, ranging from local providers to 16 of the largest: @Home Network, America Online, Ameritech, AT&T, Bell Atlantic, BellSouth, CompuServe, Concentric, EarthLink, GTE, MediaOne Express, Microsoft Network (MSN), Mindspring, Prodigy, SBC, and Sprint.

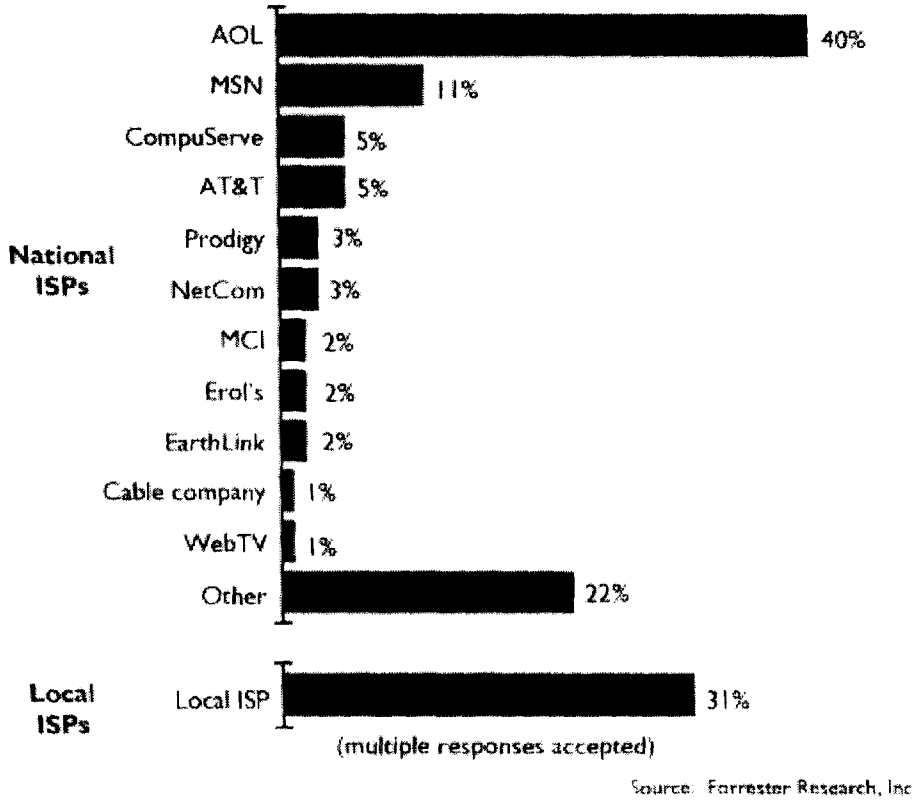
We also spoke with execs from Aware, Brooktrout Interspeed, CIDCO, Inverse Networks, Juno, Metricom, Portal Information Systems, Ramp Networks, Snap!, UUNET, and WebTV.

Finally, we analyzed data from more than 40,000 households surveyed during January by Forrester's Consumers & Technographics™ service.

IN TODAY'S ACCESS MARKET, SMALL IS BEAUTIFUL

Today's burgeoning consumer Internet access market is rapidly boiling down to two kinds of ISPs: locals and nationals. Local ISPs have 31% of household accounts, while national ISPs, including AOL, own 69% of the consumer market (see Figure 1: *Where 9700 U.S. Households Get Internet Access*). While both kinds of ISPs expect continued subscriber growth, our conversations with ISPs revealed sharp contrasts in three areas: customer experience, marketing strategies, and profitability.

Figure 1 **Where 9700 U.S. Households Get Internet Access**



Source: Forrester Research, Inc.

Customers' Experience Differs Dramatically By ISP Size

On-line consumers get their access from one of two places: "someone they know"-- a local ISP that they seek out, or "someone who knows them" -- a national provider that finds them. The supplier relationship differs dramatically as a result. Local ISP customers pay a slight premium to get friendly, helpful support -- even if it means no-frills access (see Figure 2: *Differences Between Local And National ISPs*).

> "Many of our customers are AOL graduates who know what they want when they come to us. To meet their diverse requirements, we offer three different service packages." (Local ISP)

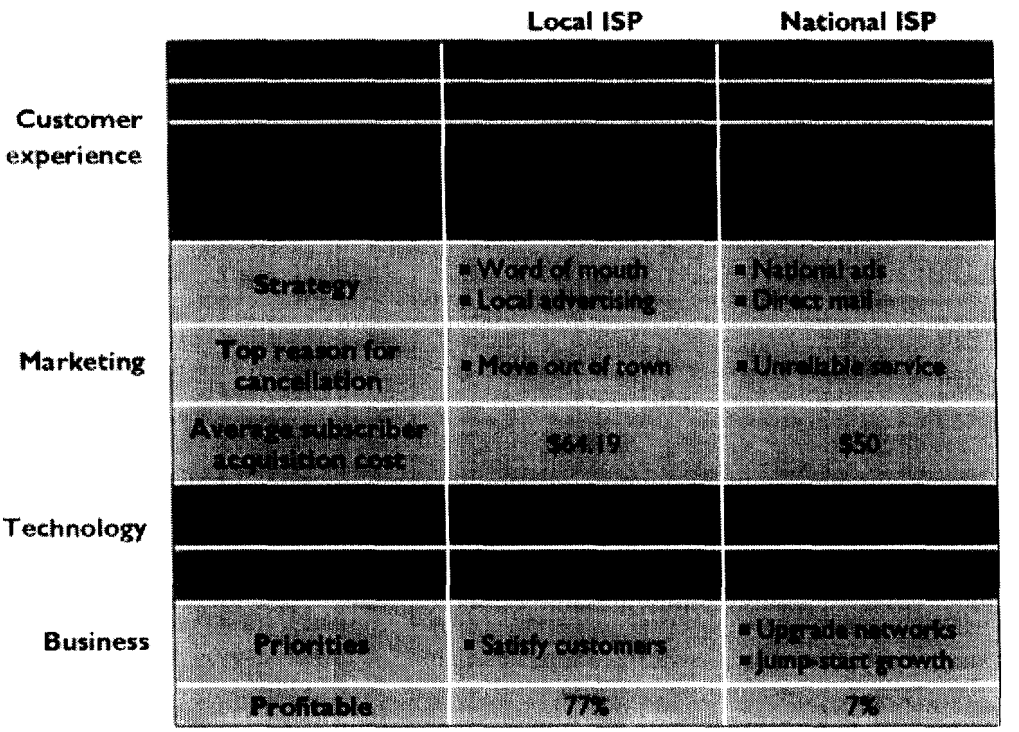
> "Customer support doesn't stop after installation. We let people call us at no cost for any kind of help as long as the account is active." (Local ISP)

Customers of national ISPs pay lower rates for a more generic, mass-market experience. To get special attention, they must pay extra.

"Most of our customers are first-time Web users. We want them to be able to click a few times and log on." (National ISP)

"We are launching a premium service for people who want tutorials. We want to make it easy for people to learn about the Internet but can't foot the bill." (National ISP)

Figure 2 **Differences Between Local And National ISPs**



Percent of 39 local and 16 national ISPs interviewed

Source: Forrester Research, Inc.

It's Guerilla Versus Gorilla Tactics In Customer Marketing

Even though ISPs say there is plenty of new business for everyone, they compete aggressively to win subscribers and minimize churn. Locals prefer low-cost guerilla marketing tactics like bounties for customers who refer others.

"Seventy-five percent of our customers come from referrals. Word of mouth is the best way to get customers." (Local ISP)

Nationals spend millions on TV and direct marketing campaigns, and many rely on existing telephone or cable service sales channels. AOL and MSN mail thousands of disks a day and lock up PC OEM deals that give them prime exposure to newcomers.

"We are getting 10,000 orders a week through direct mail and our existing channels. Our best shot is when people call to order second phone lines." (National ISP)

Local ISPs Are In The Black

Surprise: 77% of local ISPs we interviewed say they are profitable, compared with 7% of the national ISPs. Locals run lean operations and generate more revenue per customer by minimizing free trials, charging setup fees, and locking in customers with long-term service agreements.

> "We charge a $20 setup fee for all monthly accounts to help offset our acquisition costs, and we offer a $17.95 per month rate to get people to commit to three or more months in advance." (Local ISP)

National providers are still searching for profitable business models. They are just beginning to test different combinations of price and service to drive profits.

> "We were pouring a ton of money into creating content and running TV ads. By focusing on what we do best -- providing reliable access -- and adding a few pricing tiers, we will be profitable." (National ISP)

> "Profits will come at a certain scale, but we are not there yet. We need to accelerate our customer growth, since management has a low tolerance for losses in emerging businesses." (National ISP)

Interview Conclusions

Sharp distinctions between local and national ISPs are evident. Our conclusions:

- **Locals prove that consumer Internet access can be profitable.** Local providers compete successfully against high-profile nationals by understanding and meeting customers' need for personal service.
- **National ISPs are subscale -- so far.** Most national providers are struggling to balance their need for profitability with the expense burden of rapid customer-base growth.

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CONSUMER DEMAND REMAINS A CERTAINTY

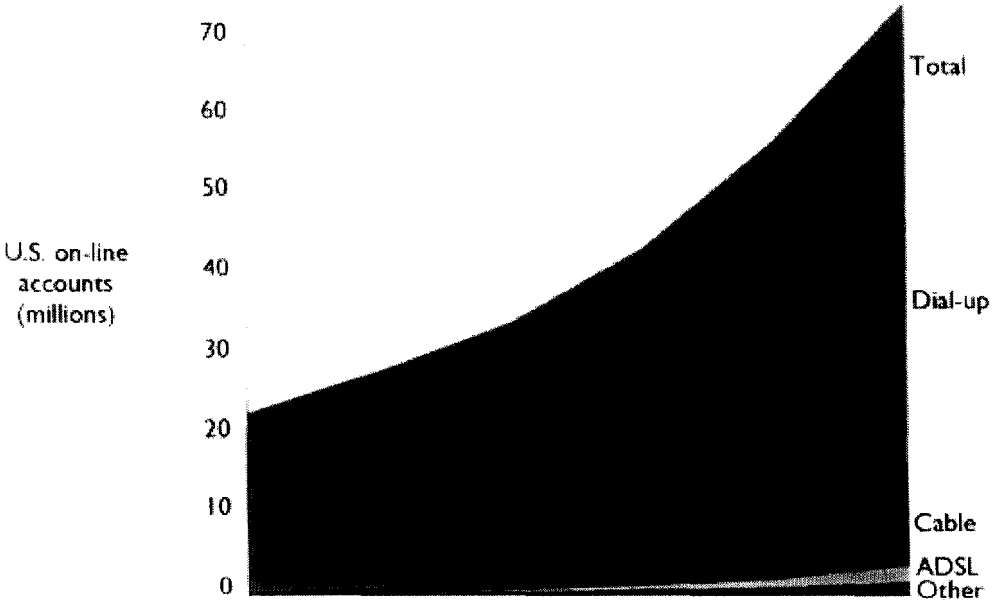
ISPs of all sizes will continue to enjoy a rising tide of customers. Market leader AOL grew from 7 million to 10 million households in 1997, while local ISPs averaged 100% growth. Forrester projects that the consumer market will grow from 23 million households today to 62 million by 2002 (see Figure 3: *Internet Household And Account Growth*). Four factors will fuel continued expansion:

- **Regulars will stay addicted.** The 17 million U.S. households on-line for more than one year form a rock-solid foundation for market growth (see the March, 1997 *People & Technology Strategies Report*, "On-line's Ongoing Struggle"). These evangelists renew for longer terms, urge friends to get on-line, and spend more money for premium services like extra e-mail boxes and Web home pages.
- **New PC households will eagerly get on-line.** Sub-$1,000 PCs with built-in Internet capability will help push total PC household penetration from 43% to 60% by 2002 (see the December, 1997 *People & Technology Strategies Report*, "Cheap PC Thrills"). We forecast that three-quarters of these 23.5 million new PC households will go on-line.
- **Everyone will urge consumers to connect.** Forrester estimates that AOL and MSN

alone will spend a mind-boggling $400 million during 1998 to promote on-line use. This marketing blitz will be further pumped by telco and computer titans pitching Internet access through telemarketers, customer service agents, and bill stuffers. Special Internet-only promotions from mainstream brands like Nike, American Airlines, and Gatorade will lure newcomers to the Web.

- **New devices will connect more people, more often.** Net-enhanced TVs and Internet screen phones will reach 20 million homes by 2002, adding 9 million new on-line households (see Figure 4: *Devices Used For Consumer Internet Access*). On-line regulars will buy phones for instant e-mail, while PC-phobics will turn to TV-based alternatives like WebTV for their access (see the February, 1997 *People & Technology Strategies Report*, "Web TV And Beyond").

Figure 3 **Internet Household And Account Growth**



	1997	1998	1999	2000	2001	2002
Dial-up	22.7	27.7	32.5	39.8	47.3	60.0
Cable modem	0.1	0.7	2.0	4.3	7.8	13.6
ADSL	--	--	0.2	0.4	1.0	2.2
ISDN, wireless, other	0.1	0.3	0.6	0.8	1.0	1.8
Total accounts (millions)	**22.9**	**28.7**	**35.3**	**45.3**	**57.1**	**77.6**
Total consumer spending	**$4.9**	**$6.5**	**$8.6**	**$11.5**	**$15.9**	**$21.8**

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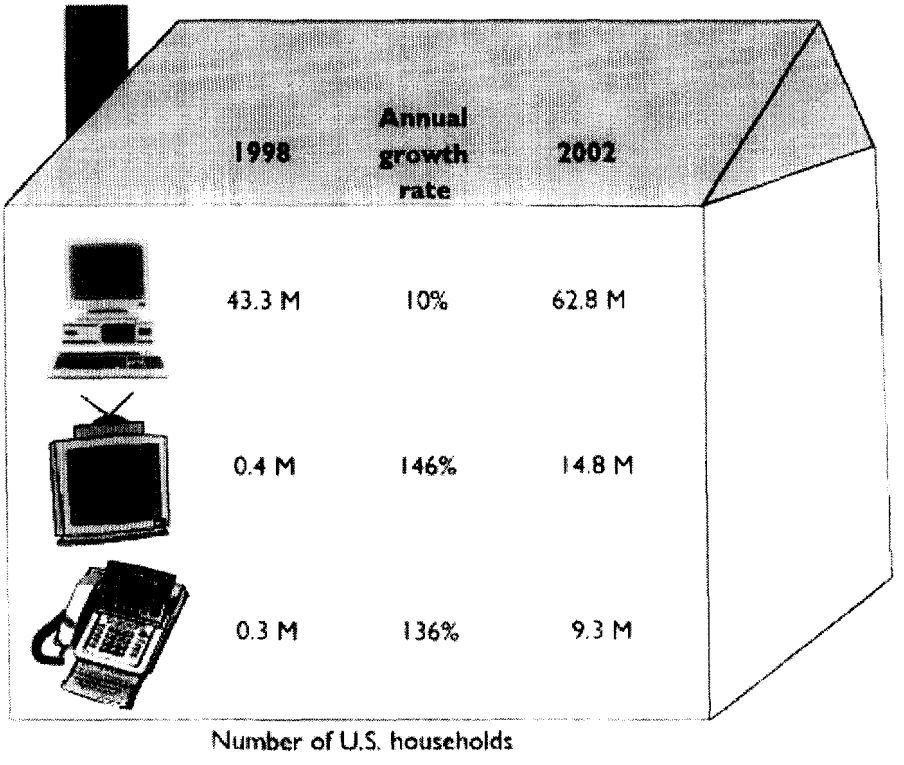
REDEFINING CONSUMER ACCESS

The Internet is on a rapid trajectory toward mass-medium status, doubling its penetration to 59% of U.S. households by 2002. As this burgeoning consumer base brings diverse interests, budgets, and preferences on-line, suppliers will respond with a proliferation of services. Diversity will spread across the landscape of consumer access in two directions:

- **More speeds and feeds.** 56 Kbps dial access will take off as the two modem standards are reconciled later this year (see Figure 5: *Emerging Access Alternatives*), reaching a full 80% of dial-up users by 2000. Multimegabit cable modem service will reach 12 million U.S. households by 2002. But faster telco services like ADSL will languish on Regional Bell Operating Companies' (RBOCs') priority lists, not cracking the 1 million user mark for four years (see the January 29, 1998 *People & Technology Strategies Brief*, "Universal ADSL: Not Even In The Ballpark").

- **More features and options.** Every packaging, pricing, and promotion avenue will be explored by consumer ISPs increasingly desperate for product differentiation.

Figure 4 **Devices Used For Consumer Internet Access**



Source Forrester Research, Inc.

Service Diversity Will Create Tough Tradeoffs For Consumers

Like kids in a candy store, consumers will face a dazzling array of service and supplier options for Internet access. They will puzzle over choices like:

- **Cheap or fast?** No-frills access will be discounted heavily as competition for subscribers heats up. Flat monthly rates of $19.95 will give way to $17, $15, and even $10 for consumers who make multiyear commitments. Others will be tempted by the fast downloads and always-on connections of their neighbors who opted for $40 per month cable modem service (see the January, 1997 *People & Technology Strategies Report*, "Cable Modems Kick In").

- **Cheap or high-quality?** Discount buyers will get what they pay for: busy signals, glacial Web downloads, and sluggish e-mail delivery. Users willing to pay extra bucks will get premium services like spam filters, encryption and virus protection, and guaranteed network availability.

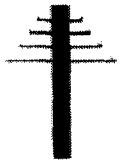
- **Specialty store or one-stop shop?** Some consumers will opt for an Internet specialist with personal service, custom features, and a ".net" e-mail address with a little cachet. Others will prefer the convenience and discounts of a service bundler that can deliver, bill, and support Internet and phone services in one fell swoop.

- **I choose them, or they choose me?** Comparison shoppers will read the Inverse Technologies performance ratings, study *Consumer Reports,* and talk with their on-line friends before choosing an ISP that matches their requirements. Impulse buyers will go with the marketing flow, responding to a telemarketer or bill insert from a long-distance

carrier.

- **Communication or content?** Half of Internet users connect primarily for e-mail and won't be enticed by Java applets and video streaming. Others want the Internet as entertainment and will choose an ISP that packages access with multimedia content or games.

Figure 5 **Emerging Access Alternatives**

	What it delivers	What it costs	Comments
56 Kbps dial-up 	▪ 52 Kbps downstream ▪ 33 Kbps upstream	▪ Modem: $49 to $89 ▪ Monthly fees: standard ISP rates ▪ No installation charge	▪ Introduced early '97 ▪ All ISPs upgrading ▪ K56flex and x2 standards merge in '98 ▪ 2.5 million users now
Cable modems 	▪ 1 Mbps to 2 Mbps upstream and downstream	▪ Modem: included, or $199 to $249 retail ▪ Monthly fees: $35 to $50 ▪ NIC: $50 ▪ Installation: $50-plus (usually waived)	▪ Launched late '96 ▪ @Home, MediaOne Express/RoadRunner ▪ 66% of cable systems ready by 2000 ▪ 110,000 users now
"ADSL Lite" 	▪ 1.5 Mbps downstream ▪ 128 Kbps upstream	▪ Modem: $199 to $299 ▪ Monthly fees: $40 plus ISP rates ▪ Installation: $200	▪ Launching year-end '98 ▪ RBOCs and GTE ▪ Limited by distance from telco central office ▪ 5,000 users now

Source: Forrester Research, Inc.

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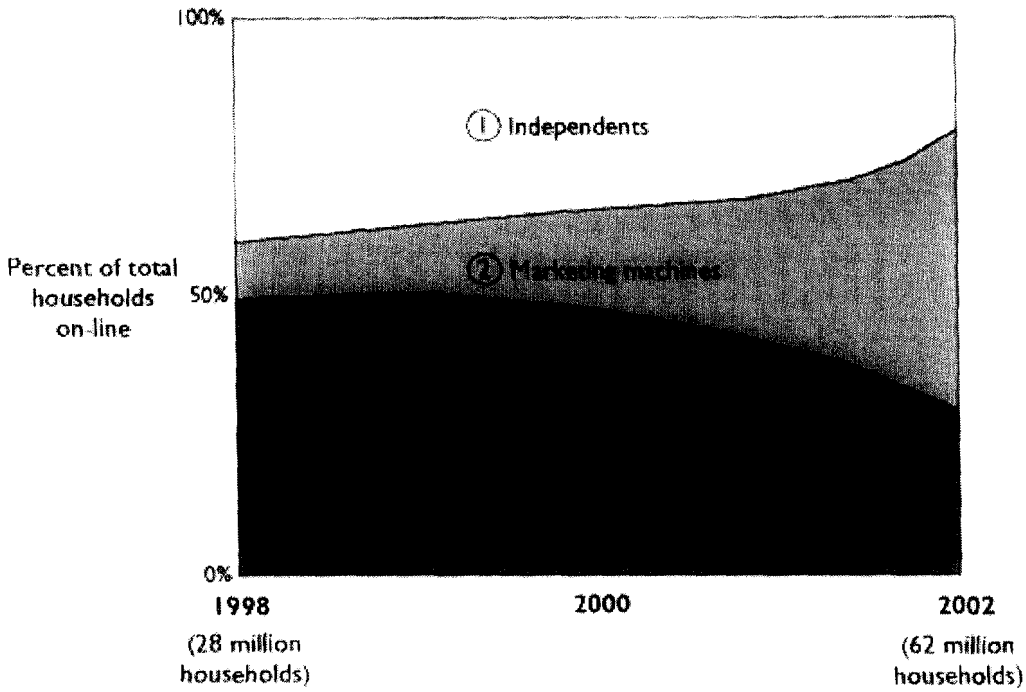
AND THE WINNERS ARE . . .

As this plethora of technology, pricing, and packaging options takes hold, the local-national ISP market dynamic will give way to a new competitive landscape. Three classes of consumer ISPs will compete for customer relationships bringing different assets and strategies to bear (see Figure 6: *Supplier Dominance Shifts*).

Figure 6 **Supplier Dominance Shifts**



Type of access provider	Leading examples	Value proposition
① Independents	▪ Local ISPs ▪ Earthlink, Erol's, Mindspring ▪ WebTV	▪ Rural access ▪ Easy-to-use, high-quality services
② Marketing machines	▪ AT&T, GTE, RBOCs ▪ MediaOne, @Home ▪ Compaq, Gateway, CUC, Fidelity	▪ Internet dial-tone as add-on to phone service ▪ Cable-based fast access and rich content ▪ Enhance existing customer relationships with branded access

Source: Forrester Research, Inc.

AOL And MSN Will Migrate Toward Content

AOL and MSN currently own 50% of the access market. By 2002, their share will decline to 30% as they move their centers of gravity from an access-inclusive subscription model toward content, advertising, and transaction revenue.

- **America Online will no longer lead.** Going forward, AOL will capture a dramatically lower share of Internet newcomers as other strong consumer ISPs take up the flag of on-line evangelism and easy-to-use connections. To grow its advertising and transaction revenue from 25% of total revenue to 50% in two years, AOL will distribute content through other ISPs, broadening the audience for AOL.com -- the centerpiece of its future.

- **MSN will master the new distribution channels.** MSN's focus has already shifted to content distribution. Its aggressive management will capitalize on Microsoft's assets: the browser, investments in cable, WebTV, and set-top boxes, and premium content like MSNBC and Investor to steal AOL's Internet audience.

- **Yahoo! and Snap! will attack from the flanks.** These start-up content networks will battle with AOL and MSN for anchor positions with faster-growing access providers like Sprint or @Home that are intent on using content as a differentiator and marketing tool.

Marketing Machines Will Grow Fastest

By capitalizing on existing customer relationships, telephone and cable companies will overcome their disappointing start in Internet access, rising from 10% of access customers today to 40% by 2002. Other membership marketers will grab 10% of customer accounts through loyalty campaigns.

- **Sprint, GTE, and BellSouth will lead the charge.** The increasingly visible threat to core voice revenues from cable and Internet telephony services will awaken telcos' leadership. Those with focused, credible Internet teams will exploit their customer relationships, brand, and ubiquitous networks to win one in five on-line customers by 2002.

- **The cable guys will beat expectations.** Cable companies like Cox and MediaOne get the Net. Their early success with cable modems, unique high-speed networks, and relationships with content providers like MTV and ESPN will propel them to a 20% share of on-line households.

- **Specialists will connect their best customers.** Companies like CUC, Fidelity, and Peapod will offer discounted or free access to their most prized customers. And technology vendors like Compaq and Gateway will subsidize access for customers to reduce support costs. Within five years, these membership marketers will grab 10% of accounts.

Smart Independents Will Cash Out Soon

Market expansion and missteps by the giants have created once-in-a-lifetime opportunities for upstarts like EarthLink, Erol's, Mindspring, and thousands of local ISPs. But customer needs for intensive tech support will fade as access gets easier, undercutting their strongest competitive advantage. The next 24 months will be a critical period for these providers.

- **Smart independents will sell out.** While they will continue to attract AOL graduates, smaller ISPs will face price and feature pressures from the telco and cable crowd. More

acquisitions will take place during the next two years, as many ISPs see the oncoming freight train and decide to cash in. Those with the best customers -- premium service users and long-term subscribers in the right ZIP codes -- will net $150 to $200 per subscriber.

- **Only the most nimble locals will survive.** By 2002, only 15% of households will get access from local ISPs, down from over 30% today. Many mom-and-pop operations will be run out of town by the nationals' marketing machines and hamstrung by their inability to offer broadband access. Local ISP survival rates will be highest in rural markets -- the 20% of the country not covered by local-dial points of presence (POPs) of the nationals.

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IMPACTS BEYOND THE ACCESS MARKET

Demand growth and supplier transformation in the ISP market will affect business strategies and have consequences for politics and society.

The Stakes Will Rise For Internet Economy Players

Twice the number of eyeballs and three times as many access and device choices will challenge everyone trying to capture and retain customers on the Internet.

- **Content providers face a double-edged sword.** Market growth delivers the audience that ABC, HomeArts, and NPR need to break even. But the move to faster access will expose sluggish content servers and increase pressure for ever-more exciting, differentiated programming. Media companies must add engineers, producers, and artists to prepare for the traffic surge and multitude of access options.

- **Merchants win with persistent connections.** The rise of cable modems and DSL means that the Internet will be "always on" in 22% of on-line households. The convenience of never having to boot the PC will translate to revenue growth for many retailers. Merchandising masters like 1-800-FLOWERS and the Gap must experiment with Java point-of-sale tools to trigger impulse buying from these high-value customers.

- **Technology tragedies abound.** Vendors will concoct hundreds of gadgets to connect households to the Internet. Most will not succeed. WebTV will morph into set-top boxes and proliferate rapidly after 2000. Phones and fax machines will get Internet addresses and connectivity. Losers like kitchen-counter recipe-finders will end up in the device composter.

- **Financial services toss in access to deepen loyalty.** In the face of rampant price wars, Merrill Lynch, Oppenheimer, and others will subsidize broadband access for their best customers. In Boston, MediaOne will partner with Fidelity and Prudential to give its high-value customers free access to Web-based financial planning and investment advice.

Widespread Access Creates Social Change

By 2002, more than half the households in the United States will be connected, making Internet access a lightening rod for social and policy action.

- **Bandwidth haves spurn the have-nots.** Access speed, not processor power, will define

the technology status of families and friends. Apartment buildings, neighborhoods, and towns will be billed as "broadband real estate" to win affluent buyers.

- **Public on-line access flourishes.** Public access will become increasingly important for two reasons: to give Sidelined Citizens a way to participate, and to give account holders access to e-mail from everywhere. Internet kiosks charging $1 to $5 an hour will sprout in libraries, airports, and shopping malls until they are as common as ATMs.

- **Shared networks rekindle privacy concerns.** By 1999, a significant cable modem network hack will spark awareness of this issue. Potential exposure of family financial and medical records will hit the pause button in cable's growth until encryption and certificate technologies are incorporated into consumers' client software.

- **President Gore says, "Access for everyone."** To make sure the other half doesn't get left behind, the Federal Communications Commission will impose telephone-style universal service charges on all Internet users to subsidize the cost of access for low-income households.

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Journal

I want my WebTV. Forrester recently sat down with Steve Perlman, CEO of Microsoft subsidiary WebTV Networks. We gleaned three interesting tidbits from our conversation:

- Sales are going well. WebTV devices are back-ordered through April. The 30,000 second-generation WebTV Plus devices manufactured for the holiday season were quickly sold out by the 6,000 retail stores carrying the product. Perlman can't yet predict how last fall's introduction of the $199 WebTV Plus will affect sales of his first product -- rechristened WebTV Classic -- which now sells for only $99.

- WebTV customers are voracious on-line users. Perlman's latest figures show the installed base -- now numbering more than a quarter of a million -- spends an average of 40 hours per month on-line, with 60% of users dialing in to the network daily.

- WebTV develops diverse products. Beyond developing the Solo microprocessor that powers the Plus box, company engineers have created an algorithm for stitching together a nationwide virtual ISP. The software allows WebTV to utilize numerous ISP POPs and load-balance the traffic to virtually eliminate busy signals.

Forrester's take: WebTV uptake is still tiny. Despite the fancy graphics and slick TV/Internet connections, WebTV remains hampered by the fact that it is a TV add-on. Consumers will expect better TV for free, and e-mail on the large-screen TV in the living room is not compelling. Its future success hinges on Microsoft's ability to morph it into a digital set-top box -- our report topic for March.

You can't spell CES with PC. Earlier this month, Forrester made the pilgrimage to Las Vegas for the Consumer Electronics Show (CES). While walking the floor full of high-definition TVs

and DVD players, we felt that something was missing. Then it struck us -- where were the PCs? With many of the computer vendors absent and most of the consumer electronics folks headlining with audio/video gear, the PC side of CES is the undercard. Microsoft reinforced this trend by burying Windows 98 beneath a sea of Windows CE applications running on PalmPilot knockoffs and car stereos. Forrester believes that the relatively low penetration of PCs in U.S. households and the rise of computing technology in toys, phones, and audio/video equipment is eroding the aura of PCs as the dominant consumer computing platform. Even as PCs reach 60% of homes by 2002, we expect home computers and their vendors to have a tough time increasing their mind share.

Are home LANs for real? For a Boston cable provider, consumer LANs can be a headache. Recently, a Forrester analyst signed up for cable modem service from MediaOne. The cable service rep said that while single-PC households are a slam-dunk to configure for high-speed Internet access, the company is bumping up against an unexpected hurdle -- multi-PC households connected by makeshift home networks. Forrester thinks that cable companies should partner with emerging home networks suppliers. As home LANs become more popular, three PCs can share one cable modem connection, increasing revenues for cable ISPs the same way multiple cable TV connections do.

Data General (DG) doesn't compute for consumers. Craig Heim, director of product marketing for Data General's THiiN Line division, briefed us on his group's goals and product plans for Internet appliances. THiiN Line's first two products were Web servers designed to be "small, simple, and cheap." Now, the DG unit is unveiling the Network Utility Box (NUB), a low-cost server designed to link home networks, small offices, and schools to the Internet via wireless connections. Initially targeted at the small-office/home-office (SOHO) market, the systems will be priced from $500 to $1,200 for the transmitter and $50 to $200 per receiver. Heim agreed with Forrester that NUB needs to cost less, and we expect some features to be simplified before NUB is officially unveiled. But even at a much lower price point, the system is still too complicated for its target audience in which IP addressing and proxy server configuration skills are nonexistent. To improve its long odds of success with SOHO and consumer markets, DG needs to partner with ISPs, local phone companies, or vendors like CompUSA that are willing to brand, install, and manage the devices remotely.

How low should you go? In last month's *People & Technology Strategies Report*, "Cheap PC Thrills," we asserted that sub-$1,000 PCs would dominate the home computer market. Just a few weeks after the report was finished, Compaq and Hewlett-Packard announced new $799 home PCs with even more power. HP's entry-level system now sports a 200 MHz Pentium processor, 32 MB of RAM, and a 56 Kbps modem. Will these low-priced but powerful systems attract new buyers? Absolutely, according to Forrester's Technographics™ 98 study, a survey of more than 130,000 U.S. households. Of the respondents who did not own a PC but are thinking of purchasing one, 49% are looking to spend less than $1,000. Of these, 34% hope to shell out only $400 to $800 for a computer. For PC companies, this means the cheap PC gold rush will continue to attract first-time buyers.

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Next Month

Home Network Reality

The sub-$1,000 PC is fueling the growth of multi-PC households. Now the computer and home automation industries want consumers to connect these systems via home networks. Next month, Forrester will examine the home network market and make the call: smoke or fire?

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Research

Forrester Research Offerings

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EXHIBIT C

TO

BELLSOUTH'S NOI COMMENTS

Cable Datacom News

Tracking the Development of High-Speed Cable Data Services

CABLE MODEM MARKET STATS AND PROJECTIONS

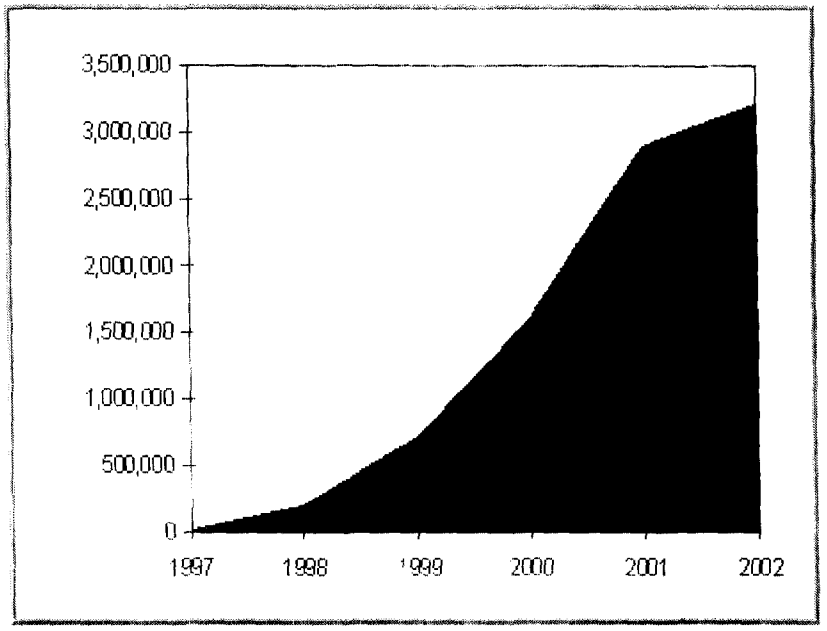
Cable Datacom News publisher Kinetic Strategies Inc. estimates the number of cable modem subscribers in North America passed the 250,000 mark by July 1, 1998. As of July, Kinetic Strategies estimates cable modem service was commercially available to more than 12 million homes, the equivalent of some 11 percent of all cable homes passed in North America. More than 85 percent of these subscribers are receiving service with two-way cable modems and the remainder are served by telco-return products.

As a group, North American cable operators are currently adding more than 1,000 cable modem subscribers per day. At this pace, Kinetic Strategies estimates the North American cable modem subscriber count will surpass 400,000 by the end of 1998 and top 1 million by the end of 1999.

@Home Network's eight MSO affiliates served more than 120,000 cable modem subscribers as of July 1. The @Home service was available to 6 million homes passed in the U.S. and Canada.

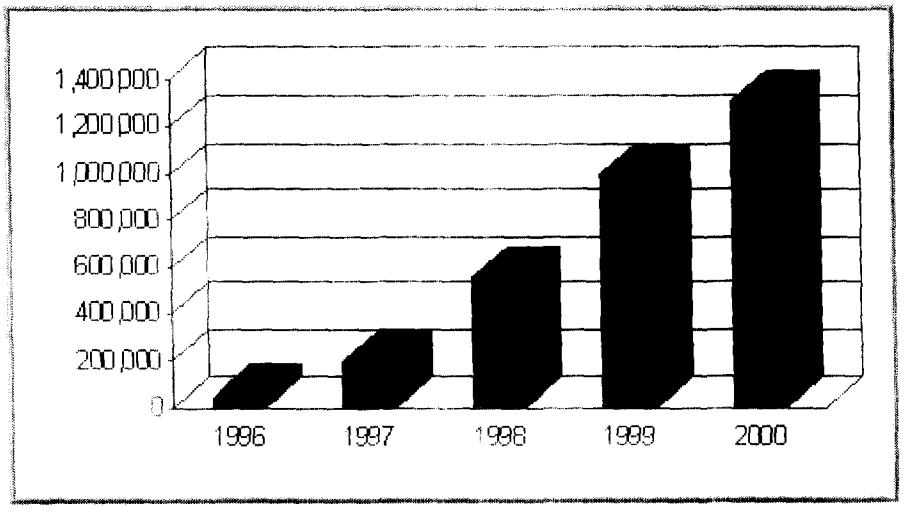
Time Warner Cable and MediaOne, which are in the process of merging their Internet operations, are collectively pushing the 90,000 mark for cable modem customers as of July 1. Together, these MSOs were offering service to 4 million homes passed.

North American 2-Way Cable Modem Subscriber Projections 1997-2002
Source: Kinetic Strategies Inc.



Kinetic Strategies estimates North American cable operators purchased some 45,000 client cable modems in 1996 and 190,000 in 1997. To meet forecasted customer demand, the firm projects vendors will ship 550,000 two-way cable modems in North America during 1998 and nearly 1 million in 1999.

North American 2-Way Cable Modem Unit Sales Projections 1996-2000
Source: Kinetic Strategies Inc.



Bay Networks Inc. and Motorola Inc. have dominated the two-way cable modem market to date and captured the lion's share of unit sales. Other vendors that captured significant sales in 1997 and 1998 include Zenith, Com21, Terayon and Toshiba America.

Cable Datacom News is published by **Kinetic Strategies Inc.**, Phoenix, Arizona USA.